

## Patent claims

1. A homo- or copolyoxymethylene containing the structural unit of formula I

5



where A is a radical derived from a homo- or copolyoxymethylene, R<sup>1</sup> is an alkylene radical having at least two carbon atoms, or a cycloalkylene radical,

10 R<sup>2</sup> is a direct carbon-carbon bond, or an alkylene, cycloalkylene, arylene, or aralkylene radical, and  
m is 0 or 1.

15 2. The homo- or copolyoxymethylene as claimed in claim 1, wherein m is 0.

20 3. The homo- or copolyoxymethylene as claimed in claim 1, wherein R<sup>1</sup> is a radical of the formula -C<sub>n</sub>H<sub>2n</sub>-, where n is a whole number from 2 to 6.

4. The homo- or copolyoxymethylene as claimed in claim 3, wherein R<sup>1</sup> is -CH<sub>2</sub>-CH<sub>2</sub>-.

25 5. The homo- or copolyoxymethylene as claimed in claim 1, wherein the polyoxymethylene radical A has from 99.9 to 90 mol% of repeat structural units of the formula -(CH<sub>2</sub>-O-)<sub>x</sub>, where x is a whole number from 100 to 10 000, and from 0.1 to 10 mol% of repeat structural units which derive from ethylene oxide, from propylene 1,2-oxide, from butylene 1,2-oxide, from butylene 1,3-oxide, from 1,3-dioxane, from 1,3-dioxolane, from 1,3-dioxepan, from 1,3,6-trioxocane, and/or from linear oligo- or polyformals.

35 6. The homo- or copolyoxymethylene as claimed in claim 1, wherein the polyoxymethylene radical A has from 99.9 to 90 mol% of repeat structural units of the formula -(CH<sub>2</sub>-O-)<sub>x</sub>, where x is a whole

number from 100 to 10 000, and from 0.1 to 10 mol% of repeat structural units of the formula



5

where  $z$  is a whole number which is at least 1.

7. The homo- or copolyoxymethylene as claimed in claim 1, wherein the structural elements of the formula  $-\text{O-CO-(R}^2\text{-CO-})_m\text{-O-}$  derive from chain-linking agents which are selected from the group consisting of derivatives of carbonic acid, in particular esters thereof or activated urea derivatives, or from esters or half-esters of dicarboxylic acids, or from dianhydrides of tetracarboxylic acids, or from mixtures of two or more of these compounds.
- 15 8. The homo- or copolyoxymethylene as claimed in claim 7, wherein the structural elements of the formula  $-\text{O-CO-(R}^2\text{-CO-})_m\text{-O-}$  derive from diesters of carbonic acid, in particular from dimethyl or diphenyl carbonate.
- 20 9. The homo- or copolyoxymethylene as claimed in claim 7, wherein the structural elements of the formula  $-\text{O-CO-(R}^2\text{-CO-})_m\text{-O-}$  derive from diesters of oxalic acid, of the aromatic dicarboxylic acids, and/or of the aliphatic dicarboxylic acids.
- 25 10. The homo- or copolyoxymethylene as claimed in claim 9, wherein the structural elements of the formula  $-\text{O-CO-(R}^2\text{-CO-})_m\text{-O-}$  derive from dimethyl esters or diphenyl esters of oxalic acid, of isophthalic acid, of phthalic acid, of adipic acid, or of sebacic acid.
- 30 11. The homo- or copolyoxymethylene as claimed in claim 7, wherein the structural elements of the formula  $-\text{O-CO-(R}^2\text{-CO-})_m\text{-O-}$  derive from oxybis(phthalic anhydride).
- 35 12. The homo- or copolyoxymethylene as claimed in claim 7, wherein the structural elements of the formula  $-\text{O-CO-(R}^2\text{-CO-})_m\text{-O-}$  derive from carbonyl N,N'-bis(caprolactamate).

13. The homo- or copolyoxymethylene as claimed in claim 1, whose melt index (MVR value, 190°C/2.16 kg/ISO 1133) is below 10 cm<sup>3</sup>/10 min, preferably below 2 cm<sup>3</sup>/10 min.

5

14. A process for the chain-extension of homo- or copolyoxymethylenes, encompassing the reaction of homo- or copolyoxymethylenes of the formula II with at least one chain-linking agent of the formula III

10



where A is a radical derived from a homo- or copolyoxymethylene, R<sup>1</sup> is an alkylene radical having at least two carbon atoms, or a cycloalkylene radical,

15

R<sup>2</sup> is a direct carbon-carbon bond or an alkylene, cycloalkylene, arylene, or aralkylene radical,

R<sup>4</sup> is a radical of the formulae -OH, -O-R<sup>5</sup>, -O-CO-R<sup>6</sup>, or in particular -O-R<sup>1</sup>-OH, where R<sup>1</sup> is as defined at an earlier stage above,

20

R<sup>5</sup> is an alkyl, cycloalkyl, aryl, or aralkyl radical,

R<sup>6</sup> is hydrogen or an alkyl, cycloalkyl, aryl, or aralkyl radical,

m is 0 or 1, and

25

R<sup>7</sup> and R<sup>8</sup>, independently of one another, are alkoxy, cycloalkoxy, aryloxy, aralkyloxy, or a lactam radical bonded by way of the nitrogen atom, or where, in the case where m = 1, R<sup>7</sup> and/or R<sup>8</sup> together with another carboxylic acid group of the radical R<sup>2</sup> form an anhydride or imide group.

15. The process as claimed in claim 14, wherein the reaction takes place in the presence of a catalyst which is a Lewis acid or is a Lewis base.

30

16. The process as claimed in claim 15, wherein the catalyst used comprises the alkali metal or alkaline earth metal salts of acetylacetones, in particular lithium acetylacetone or sodium acetylacetone, and/or alkali metal alkoxides, in particular sodium

35

methoxide or lithium methoxide, and/or lithium halides, in particular lithium chloride.

17. The process as claimed in claim 14, wherein the reaction takes place at temperatures of from 100 to 240°C, preferably from 150 to 220°C, and the reaction time is from 0.5 to 60 minutes.
- 5 18. The process as claimed in claim 14, wherein the amount used of homo- or copolyoxymethylene of the formula II, per mole of chain-linking agent of the formula III, is such that the content of the end groups  $-O-R^1-OH$  present at the start of the chain-linkage reaction is in the range from one quarter of one mol to four mol.
- 10 19. The process as claimed in claim 14, wherein the reaction takes place at temperatures such that the reaction mixture is liquid, or such that a liquid phase forms in the reaction mixture.
- 15 20. The process as claimed in claim 14, wherein, from a mixture of compounds of the formulae II and III, if appropriate of a catalyst, and, where appropriate, of other additives, a molded structure is produced and is heated in a stream of gas and/or in a vacuum for a period such that the desired molecular weight increase has been achieved, the temperatures selected here being such that the reaction mixture is solid.
- 25 21. The use of the homo- or copolyoxymethylene as claimed in claim 1 for producing moldings, in particular for producing fibers, films, hoses, pipes, rods, or profiles.